

Remarks

The present Amendment is in response to the Official Action mailed on August 8, 2005. A petition and fee for a one-month extension of the three-month shortened statutory deadline for response are enclosed. The Official Action objected to the title of the invention as “not descriptive”. The Official Action rejected claims 1-3, 7-8, 10-11 and 19 under 35 U.S.C. § 102(b) as assertedly being anticipated by the Katz U.S. Patent No. 6,403,397 (“Katz”). The Official Action also rejected claims 4-6, 9, and 2-13 under 35 U.S.C. § 103(a) as assertedly being obvious over Katz in view of Klauk, H. et al., “High-Mobility Polymer Gate Dielectric Pentacene Thin Film Transistors”, Journal of Applied Physics, Vol. 92, No. 9, pp. 5259-5263 (Nov. 1, 2002) (“Klauk”); and further in view of Mushrush, M. et al., “Easily Processable Phenylene-Thiophene-Based Organic Field-Effect Transistors and Solution-Fabricated Nonvolatile Transistor Memory Elements”, Journal American Chemical Society, Vol. 125, No. 31, pp. 9414-9423 (2003) (“Mushrush”). Claim 9 has been amended to be more clear and distinct. Claims 14-18 and 20 were withdrawn and are now cancelled without prejudice. New claims 21-26 have been added. Claims 1-13, 19 and 21-26 are presently pending.

Telephonic Interview

Counsel for Applicants contacted Examiner Nguyen by telephone on November 17, 2005 to verify that there is no objection outstanding that relates to the declaration or drawings. The Examiner confirmed that there is no such objection.

The Objection to the Specification

The Official Action objected to the title as not descriptive. The title has been accordingly revised.

The Rejection Under 35 U.S.C. § 102(b)

Claims 1-3, 7-8, 10-11 and 19 stand rejected under 35 U.S.C. § 102(b) as assertedly being anticipated by Katz. Applicants respectfully traverse this rejection and request that it now be withdrawn, in view of the discussion below.

The Official Action cites FIGS. 1 and 2 of Katz in support of this rejection. A semiconductor device having a top contact geometry, as shown schematically in FIG. 1 of Katz, generally involves depositing a semiconductor film 16 onto a dielectric surface 14. Katz, col. 2, lines 52-54. Katz' bottom contact geometry semiconductor device is shown in FIG. 2. In such a geometry, source and drain contacts 38 and 40 are formed onto a dielectric layer 34, with the semiconductor layer 36 being formed over at least a portion of the contacts 38 and 40 and over a portion of the dielectric layer 34. Katz fails to disclose and fails to suggest, in FIGS. 1-2 or elsewhere, a dielectric layer having a surface with exposed aromatic groups. Katz teaches only the use of various non-aromatic dielectric materials. Katz further fails to disclose and fails to suggest a polycrystalline semiconductor layer comprising an organic semiconductor composition, overlying and in contact with a portion of a surface having exposed aromatic groups. Therefore Katz fails to disclose and fails to suggest pending independent claim 1 or claim 19.

The Official Action acknowledges at page 5 that Katz "does not teach dielectric layer is formed from a precursor composition of the group consisting of naphthalenes, styrenes, phenols,

and cresols of poly(4-vinylphenol-co-2-hydroxyethyl methacrylate)". That acknowledgement understates the shortcomings of Katz as a reference. Katz does not disclose or suggest any dielectric layer having a surface with exposed aromatic groups. Katz only discloses the conventional use of various dielectric layers having a non-aromatic surface.

Claims 2, 3, 7-8, and 10-11 all depend directly or indirectly from claim 1. The Official Action further cites Katz at col. 4, lines 1-23 and col. 7-8 in support of the rejections of the dependent claims. Those passages of Katz also fail to disclose and fail to suggest a dielectric layer having a surface with exposed aromatic groups.

The Rejection Under 35 U.S.C. § 103(a)

Claims 4-6, 9, and 2-13 stand rejected under 35 U.S.C. § 103(a) as assertedly being obvious over Katz in view of Klauk and Mushrush. All of claims 4-6, 9 and 2-13 depend directly or indirectly from claim 1, discussed above. Applicants respectfully traverse this rejection and request that it now be withdrawn, in view of the above discussion of Katz deemed repeated here, and the further discussion below.

Klauk discloses a pentacene organic thin film transistor including poly-4-vinylphenol-co-2-hydroxyethylmethacrylate as a gate dielectric layer. Klauk, p. 5259, right column. Pentacene does not have alkyl chains. Klauk accordingly fails to disclose and fails to suggest an organic thin film transistor including such a gate dielectric layer, having deposited on the gate dielectric, an organic semiconductor composition comprising a compound comprising a chain-like moiety, the chain-like moiety comprising a conjugated thiophene or phenyl group and comprising alkyl chains at ends of the chain-like moiety. Therefore Klauk fails to disclose and fails to suggest

pending independent claim 1 or claim 19. Katz discloses only the use of various dielectric layers having non-aromatic exposed surfaces. Claims 1 and 19 recite the use of dielectric layers with surfaces having exposed aromatic groups, contrary to the conventional wisdom of Katz. Klauk teaches the use of a poly-4-vinylphenol-co-2-hydroxyethylmethacrylate dielectric layer with pentacene - an organic semiconductor that does not have alkyl chains. There is no motivation, aside from Applicants' own specification, to use Klauk's dielectric layer to modify Katz' disclosed devices consistently incorporating Katz' teachings of organic semiconductors formed on dielectric layers that have non-aromatic exposed surfaces.

Mushrush discloses organic field-effect transistors including semiconductor films formed on silicon dioxide- and glass resin-coated substrates. The semiconductors disclosed include: 2,5-bis(4-n-hexylphenyl)thiophene; 5,5'-Bis(4-n-hexylphenyl)-2,2'-bithiophene (6PTTP6); 5,5''-Bis(4-n-hexylphenyl)-2,2':5',2''-terthiophene (6PTTTP6); 5,5'''-Bis(4-n-hexylphenyl)-2,2':5',2''':5'',2'''-quaterthiophene (6PTTTTP6); 1,4-Bis[5-(4-n-hexylphenyl)-2-thienyl]benzene (6PTPTP6); 2,5-Bis[4(4'-n-hexylphenyl)phenyl]thiophene (6PPTPP6). Mushrush, p. 9414. Mushrush discloses that for solution depositions, 3M Novec EGC-1700 fluorocarbon electronic coating was applied to the silicon dioxide surface before the semiconductor. Mushrush, p. 9416. Mushrush nowhere indicates or suggests that 3M Novec EGC-1700 fluorocarbon includes any exposed aromatic groups. Furthermore, the current Material Safety Data Sheet for 3M Novec EGC-1700 fluorocarbon, copy attached, indicates that it is a non-aromatic composition. Mushrush fails to disclose and fails to suggest, at pages 9414 or 9416 or elsewhere, a dielectric layer having a surface with exposed aromatic groups. Thus, consistent with the conventional wisdom of Katz, Mushrush teaches the formation of organic semiconductors on dielectric layers

having a non-aromatic surface. Mushrush further fails to disclose and fails to suggest a polycrystalline semiconductor layer comprising an organic semiconductor composition overlying and in contact with a portion of a surface having exposed aromatic groups. Therefore Mushrush fails to disclose and fails to suggest pending independent claim 1 or claim 19. Mushrush discloses a conventional teaching, consistent with Katz, to deposit an organic semiconductor on a dielectric layer having a non-aromatic surface. Mushrush fails to remedy the defects of Katz as a reference against claims 1 and 19. Applicants also expressly traverse the reference made at page 6 of the Official Action, in the discussion of Mushrush, to the phrase “concentration of hydrogen”. The relevance of this phrase to the rejection is not made clear by the Official Action.

The Official Action attempts to substantiate a rejection of claims 4-6, 9, and 2-13 under 35 U.S.C. § 103(a) by combining Katz, Klauk and Mushrush. Each of Katz and Mushrush fails to disclose and fails to suggest the formation of an organic semiconductor layer on a surface having exposed aromatic groups. Each of Katz and Mushrush teaches the conventional wisdom of using a dielectric layer having a non-aromatic surface on which an organic semiconductor is deposited. There is no motivation in any of the references to modify the conventional wisdom of Katz or Mushrush to replace their expressly and consistently taught dielectric layers having non-aromatic surfaces by Klauk’s poly-4-vinylphenol-co-2-hydroxyethylmethacrylate gate dielectric layer.

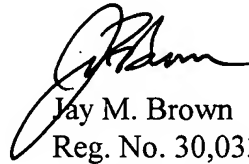
The Official Action cannot use Applicants’ own specification in this manner to combine and then modify the cited references in order to ground this rejection of the claims. In particular, the Official Action cannot use Applicants’ own specification in this manner to override the conventional wisdom consistently taught in Katz and Mushrush, and to modify either of them

using Klauk in a manner that Klauk nowhere suggests in order to ground this rejection of the claims. The totality of the prior art must be considered, and proceeding contrary to accepted wisdom in the art is evidence of unobviousness. *In re Hedges*, 783 F.2d 1038, 228 USPQ 685 (Fed. Cir. 1986); MPEP, section 2145(X)(D)(3).

Conclusion

Since all of the pending claims, as amended, are not anticipated by and are unobvious over the cited references, Applicants believe that this application is now in order for allowance. The Examiner is respectfully requested and invited to contact the undersigned by telephone in order to resolve any remaining issues.

Respectfully submitted,



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